Amendments to the Claims:

Please add new claims 67-71. Please amend claims 1, 26, and 51 as follows.

The listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of claims:

1. (Currently Amended) A video data compression unit comprising:

a motion estimation processor for receiving current video data from a data bus and for generating differential video data based on a difference between the current video data and reference video data;

a transform coder receiving the differential video data directly from the motion estimation processor and for transforming the differential video data from the spatial domain to the frequency domain to generate transformed video data; and

a local memory for storing the transformed video data and for storing the differential video data generated by, and received from, the motion estimation processor.

2. (Original) The video data compression unit of claim 1 wherein the transform coder receives the differential video data directly from the motion estimation processor, independent of the data bus.

3. (Original) The video data compression unit of claim 1 wherein the transformed video data is written directly to the local memory for storage, independent of the data bus.

4. (Original) The video data compression unit of claim 1 wherein the transform coder further retrieves the transformed video data from the local memory and inverse-transforms the transformed video data from the frequency domain to the spatial domain to generate inverse-transformed video data.

5. (Original) The video data compression unit of claim 4 wherein the transform coder comprises:

a discrete-cosine transform (DCT) unit for transforming the differential video data from the spatial domain to the frequency domain to generate transformed differential video data; and

an inverse-discrete-cosine transform (IDCT) unit for inverse-transforming the transformed video data stored in the local memory from the frequency domain to the spatial domain.

6. (Original) The video data compression unit of claim 5 wherein the discrete-cosine transform unit receives the differential video data directly from the motion estimation processor, independent of the data bus.

7. (Original) The video data compression unit of claim 5 wherein the discrete-cosine transform unit performs the transforming operation on the differential video data as segments of the differential video data are generated by the motion estimation processor, such that the discrete-cosine transform unit and the motion estimation processor operate contemporaneously on the differential video data.

8. (Original) The video data compression unit of claim 5 wherein the transform coder further comprises:

a quantization unit for quantizing the transformed differential video data output by the discrete-cosine transform (DCT) unit to generate the transformed video data; and

an inverse quantization unit for inverse-quantizing the transformed video data stored in local memory, an output of which is provided to the inverse discrete-cosine-transform unit.

9. (Original) The video data compression unit of claim 8 wherein the quantization unit receives the transformed differential video data directly from the discrete-cosine transform unit, independent of the data bus.

10. (Original) The video data compression unit of claim 8 wherein the inverse quantization unit receives the transformed video data directly from the local memory, independent of the data bus.

11. (Original) The video data compression unit of claim 8 wherein the inverse-discrete-cosine transform unit receives the output of the inverse quantization unit as the transformed video data directly from the inverse quantization unit, independent of the data bus.

12. (Original) The video data compression unit of claim 8 wherein the transform coder operates in a forward mode and an inverse mode, wherein when in the forward mode of operation, the discrete-cosine-transform unit and the quantization unit are active, and, when in the reverse mode of operation the inverse discrete-cosine-transform unit and the inverse quantization unit are active.

13. (Original) The video data compression unit of claim 12 wherein the transform coder selects between the forward mode and the inverse mode based on a status of the transform coder mode selection signal.

14. (Original) The video data compression unit of claim 13 wherein the transform coder mode selection signal is generated in response to a count of transformed video signals processed by the local memory.

15. (Original) The video data compression unit of claim 8 wherein the quantization unit performs the quantization operation on the transformed differential video data as

segments of the transformed differential video data are generated by the discrete-cosine transform unit, such that the quantization unit and the discrete-cosine transform unit operate contemporaneously on the transformed differential video data.

16. (Original) The video data compression unit of claim 8 wherein the inverse-discrete-transform unit performs the inverse-transforming operation on the video data output of the inverse quantization unit as segments of the output data of the inverse quantization unit are generated by the inverse quantization unit, such that the inverse-discrete-transform unit and the quantization unit operate contemporaneously on the output data of the inverse quantization unit.

17. (Original) The video data compression unit of claim 4 wherein the motion estimation processor comprises:

a motion estimation unit for generating a motion vector based on the current video data and the reference video data;

a mode decision unit for determining a mode of operation based on the motion vector, the mode of operation being one of an intra-mode and an inter-mode; and

a motion compensation unit for generating the differential data based on the determined mode of operation, such that when the mode of operation is the intra-mode, the current video data is output by the motion estimation processor as the differential video data, and such that when the mode of operation is the inter-mode, the differential data is generated by the motion compensation unit based on the difference between the current video data and the reference video data.

18. (Original) The video data compression unit of claim 17 further comprising a composer for combining the inverse-transformed video data and the reference video data, and for outputting the combined data as reconstructed video data.

19. (Original) The video data compression unit of claim 18 wherein, when the mode of operation is the inter-mode, the reference video data is stored in the local memory and wherein the composer receives the reference video data directly from the local memory, independent of the data bus.

20. (Original) The video data compression unit of claim 18 wherein the composer receives the inverse-transformed video data directly from the transform coder, independent of the data bus.

21. (Original) The video data compression unit of claim 18 wherein the reconstructed video data is output to the data bus, wherein the reconstructed video data from a previous frame is used as the reference video data for a subsequent frame.

22. (Original) The video data compression unit of claim 1 further comprising an output unit for processing the transformed video data and for outputting the transformed video data as compressed video data.

23. (Original) The video data compression unit of claim 22 wherein the output unit comprises a zig-zag scanning unit and a variable-length coding (VLC) unit for statistical reduction of the transformed data.

24. (Original) The video data compression unit of claim 1 wherein the local memory comprises:

a first local memory for storing the current video data and reference video data received from the data bus and for storing reconstructed video data generated by a composer based on the transformed video data and the reference video data to be output to the data bus;

a second local memory for storing the reference video data for access by the composer; and

a third local memory for storing the transformed video data output by the transform coder.

25. (Original) The video data compression unit of claim 24 further comprising a DMA controller for retrieving the current video data and the reference video data from the data bus for storage in the first local memory and for transmitting the reconstructed video data from the first local memory to the data bus.

26. (Currently Amended) A video data compression system comprising:

a processing unit coupled to a data bus;

a memory controller coupled between the data bus and external memory; and

a video data core unit comprising:

a motion estimation processor for receiving current video data from the data bus and for generating differential video data based on a difference between the current video data and reference video data;

a transform coder receiving the differential video data directly from the motion estimation processor and for transforming the differential video data from the spatial domain to the frequency domain to generate transformed video data; and

a local memory for storing the transformed video data <u>and for storing the differential video data generated by, and received from, the motion estimation processor</u>.

27. (Original) The video data compression system of claim 26 wherein the transform coder receives the differential video data directly from the motion estimation processor, independent of the data bus.

28. (Original) The video data compression system of claim 26 wherein the transformed video data is written directly to the local memory for storage, independent of the data bus.

29. (Original) The video data compression system of claim 26 wherein the transform coder further retrieves the transformed video data from the local memory and inverse-transforms the transformed video data from the frequency domain to the spatial domain to generate inverse-transformed video data.

30. (Original) The video data compression system of claim 29 wherein the transform coder comprises:

a discrete-cosine transform (DCT) unit for transforming the differential video data from the spatial domain to the frequency domain to generate transformed differential video data; and

an inverse-discrete-cosine transform (IDCT) unit for inverse-transforming the transformed video data stored in the local memory from the frequency domain to the spatial domain.

31. (Original) The video data compression system of claim 30 wherein the discrete-cosine transform unit receives the differential video data directly from the motion estimation processor, independent of the data bus.

32. (Original) The video data compression system of claim 30 wherein the discrete-cosine transform unit performs the transforming operation on the differential video data as segments of the differential video data are generated by the motion estimation processor, such that the discrete-cosine transform unit and the motion estimation processor operate contemporaneously on the differential video data.

33. (Original) The video data compression system of claim 30 wherein the transform coder further comprises:

a quantization unit for quantizing the transformed differential video data output by the discrete-cosine transform (DCT) unit to generate the transformed video data; and

an inverse quantization unit for inverse-quantizing the transformed video data stored in local memory, an output of which is provided to the inverse discrete-cosine-transform unit.

34. (Original) The video data compression system of claim 33 wherein the quantization unit receives the transformed differential video data directly from the discrete-cosine transform unit, independent of the data bus.

35. (Original) The video data compression system of claim 33 wherein the inverse quantization unit receives the transformed video data directly from the local memory, independent of the data bus.

36. (Original) The video data compression system of claim 33 wherein the inverse-discrete-cosine transform unit receives the output of the inverse quantization unit as the transformed video data directly from the inverse quantization unit, independent of the data bus.

37. (Original) The video data compression system of claim 33 wherein the transform coder operates in a forward mode and an inverse mode, wherein when in the forward mode of operation, the discrete-cosine-transform unit and the quantization unit are active, and, when in the reverse mode of operation the inverse discrete-cosine-transform unit and the inverse quantization unit are active.

38. (Original) The video data compression system of claim 37 wherein the transform coder selects between the forward mode and the inverse mode based on a status of the transform coder mode selection signal.

39. (Original) The video data compression system of claim 38 wherein the transform coder mode selection signal is generated in response to a count of transformed video signals processed by the local memory.

40. (Original) The video data compression system of claim 33 wherein the quantization unit performs the quantization operation on the transformed differential video data as segments of the transformed differential video data are generated by the discrete-cosine transform unit, such that the quantization unit and the discrete-cosine transform unit operate contemporaneously on the transformed differential video data.

41. (Original) The video data compression system of claim 33 wherein the inverse-discrete-transform unit performs the inverse-transforming operation on the video data output of the inverse quantization unit as segments of the output data of the inverse quantization unit are generated by the inverse quantization unit, such that the inverse-discrete-transform unit and the quantization unit operate contemporaneously on the output data of the inverse quantization unit.

42. (Original) The video data compression system of claim 29 wherein the motion estimation processor comprises:

a motion estimation unit for generating a motion vector based on the current video data and the reference video data;

a mode decision unit for determining a mode of operation based on the motion vector, the mode of operation being one of an intra-mode and an inter-mode; and

a motion compensation unit for generating the differential data based on the determined mode of operation, such that when the mode of operation is the intra-mode, the current video data is output by the motion estimation processor as the differential video data, and such that when the mode of operation is the inter-mode, the differential data is generated by the motion compensation unit based on the difference between the current video data and the reference video data.

43. (Original) The video data compression system of claim 42 further comprising a composer for combining the inverse-transformed video data and the reference video data, and for outputting the combined data as reconstructed video data.

44. (Original) The video data compression system of claim 43 wherein, when the mode of operation is the inter-mode, the reference video data is stored in the local memory and wherein the composer receives the reference video data directly from the local memory, independent of the data bus.

45. (Original) The video data compression system of claim 43 wherein the composer receives the inverse-transformed video data directly from the transform coder, independent of the data bus.

46. (Original) The video data compression system of claim 43 wherein the reconstructed video data is output to the data bus, wherein the reconstructed video data from a previous cycle is used as the reference video data for a subsequent cycle.

47. (Original) The video data compression system of claim 26 further comprising an output unit for processing the transformed video data and for outputting the transformed video data as compressed video data.

48. (Original) The video data compression system of claim 47 wherein the output unit comprises a zig-zag scanning unit and a variable-length coding (VLC) unit for statistical reduction of the transformed data.

49. (Original) The video data compression system of claim 26 wherein the local memory comprises:

a first local memory for storing the current video data and reference video data received from the data bus and for storing reconstructed video data generated by a composer based on the transformed video data and the reference video data to be output to the data bus;

a second local memory for storing the reference video data for access by the composer; and

a third local memory for storing the transformed video data output by the transform coder.

50. (Original) The video data compression unit of claim 49 further comprising a DMA controller for retrieving the current video data and the reference video data from the data bus for storage in the first local memory and for transmitting the reconstructed video data from the first local memory to the data bus.

51. (Currently Amended) A method for compressing video data comprising:

receiving current video data from a data bus at a motion estimation processor and generating differential video data based on a difference between the current video data and reference video data;

receiving the differential video data directly at a transform coder and transforming the differential video data from the spatial domain to the frequency domain to generate transformed video data; [[and]]

storing the transformed video data, <u>and storing the differential video data generated by, and received from, the motion estimation processor,</u> in local memory.

52. (Original) The method of claim 51 further comprising receiving the differential video data directly from the motion estimation processor, independent of the data bus.

53. (Original) The method of claim 51 wherein further comprising writing the transformed video data directly to the local memory for storage, independent of the data bus.

54. (Original) The method of claim 51 wherein transforming further comprises retrieving the transformed video data from the local memory and inverse-transforming the transformed video data from the frequency domain to the spatial domain to generate inverse-transformed video data.

55. (Original) The method of claim 54 further comprising:

transforming the differential video data from the spatial domain to the frequency domain using a discrete-cosine transform (DCT) to generate transformed differential video data; and

inverse-transforming the transformed video data stored in the local memory from the frequency domain to the spatial domain using an inverse-discrete-cosine transform (IDCT).

56. (Original) The method of claim 55 further comprising receiving the differential video data directly, independent of the data bus.

57. (Original) The method of claim 55 wherein transforming using discrete-cosine transform comprises transforming the differential video data as segments of the differential video data are generated by the motion estimation processor, such that generating differential video data and transforming the differential video data are performed contemporaneously on the differential video data.

58. (Original) The method of claim 55 wherein transforming further comprises:

quantizing, at a quantization unit, the transformed differential video data that is discrete-cosine transformed to generate the transformed video data; and

inverse-quantizing, at an inverse-quantization unit, the transformed video data stored in local memory prior to inverse discrete-cosine-transforming the data.

59. (Original) The method of claim 58 wherein the discrete-cosine transformed data is received directly at the quantization unit, independent of the data bus.

60. (Original) The method of claim 58 wherein the transformed video data is received directly by the inverse-quantization unit, independent of the data bus.

61. (Original) The method of claim 58 wherein transforming occurs in a forward mode and an inverse mode of operation, wherein when in the forward mode of operation, the discrete-cosine-transform and quantization operations are active, and, when in the

reverse mode of operation the inverse discrete-cosine-transform and the inverse quantization operations are active.

62. (Original) The method of claim 54 wherein generating differential video data comprises:

generating a motion vector based on the current video data and the reference video data;

determining a mode of operation based on the motion vector, the mode of operation being one of an intra-mode and an inter-mode; and

generating the differential data based on the determined mode of operation, such that when the mode of operation is the intra-mode, the current video data is output as the differential video data, and such that when the mode of operation is the inter-mode, the differential data is generated based on the difference between the current video data and the reference video data.

63. (Original) The method of claim 62 further comprising combining the inverse-transformed video data and the reference video data, and outputting the combined data as reconstructed video data.

64. (Original) The method of claim 63 wherein, when the mode of operation is the inter-mode, the reference video data is stored in the local memory and wherein the step of combining comprises receiving the reference video data directly from the local memory, independent of the data bus.

65. (Original) The method of claim 63 wherein the reconstructed video data is output to the data bus, wherein the reconstructed video data from a previous frame is used as the reference video data for a subsequent frame.

66. (Original) The method of claim 51 wherein the local memory comprises:

a first local memory for storing the current video data and reference video data received from the data bus and for storing reconstructed video data generated based on the transformed video data and the reference video data to be output to the data bus;

a second local memory for storing the reference video data; and

a third local memory for storing the transformed video data.

67. (New) A video data compression unit comprising:

a motion estimation processor for receiving current video data from a data bus and for generating differential video data based on a difference between the current video data and reference video data;

a transform coder receiving the differential video data directly from the motion estimation processor and for transforming the differential video data from the spatial domain to the frequency domain to generate transformed video data; and

a local memory for storing the transformed video data, wherein the local memory comprises:

a first local memory for storing the current video data and reference video data received from the data bus and for storing reconstructed video data generated by a composer based on the transformed video data and the reference video data to be output to the data bus;

a second local memory for storing the reference video data for access by the composer; and

a third local memory for storing the transformed video data output by the transform coder.

68. (New) The video data compression unit of claim 67 further comprising a DMA controller for retrieving the current video data and the reference video data from the data bus for storage in the first local memory and for transmitting the reconstructed video data from the first local memory to the data bus.

69. (New) A video data compression system comprising:

a processing unit coupled to a data bus;

a memory controller coupled between the data bus and external memory; and

a video data core unit comprising:

a motion estimation processor for receiving current video data from the data bus and for generating differential video data based on a difference between the current video data and reference video data;

a transform coder receiving the differential video data directly from the motion estimation processor and for transforming the differential video data from the spatial domain to the frequency domain to generate transformed video data; and

a local memory for storing the transformed video data, wherein the local memory comprises:

a first local memory for storing the current video data and reference video data received from the data bus and for storing reconstructed video data generated by a composer based on the transformed video data and the reference video data to be output to the data bus;

a second local memory for storing the reference video data for access by the composer; and

a third local memory for storing the transformed video data output by the transform coder.

70. (New) The video data compression unit of claim 69 further comprising a DMA controller for retrieving the current video data and the reference video data from the data bus for storage in the first local memory and for transmitting the reconstructed video data from the first local memory to the data bus.

71. (New) A method for compressing video data comprising:

receiving current video data from a data bus at a motion estimation processor and generating differential video data based on a difference between the current video data and reference video data;

receiving the differential video data directly at a transform coder and transforming the differential video data from the spatial domain to the frequency domain to generate transformed video data; and

storing the transformed video data in local memory, wherein the local memory comprises:

a first local memory for storing the current video data and reference video data received from the data bus and for storing reconstructed video data generated based on the transformed video data and the reference video data to be output to the data bus;

a second local memory for storing the reference video data; and

a third local memory for storing the transformed video data.